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Night Sky Model

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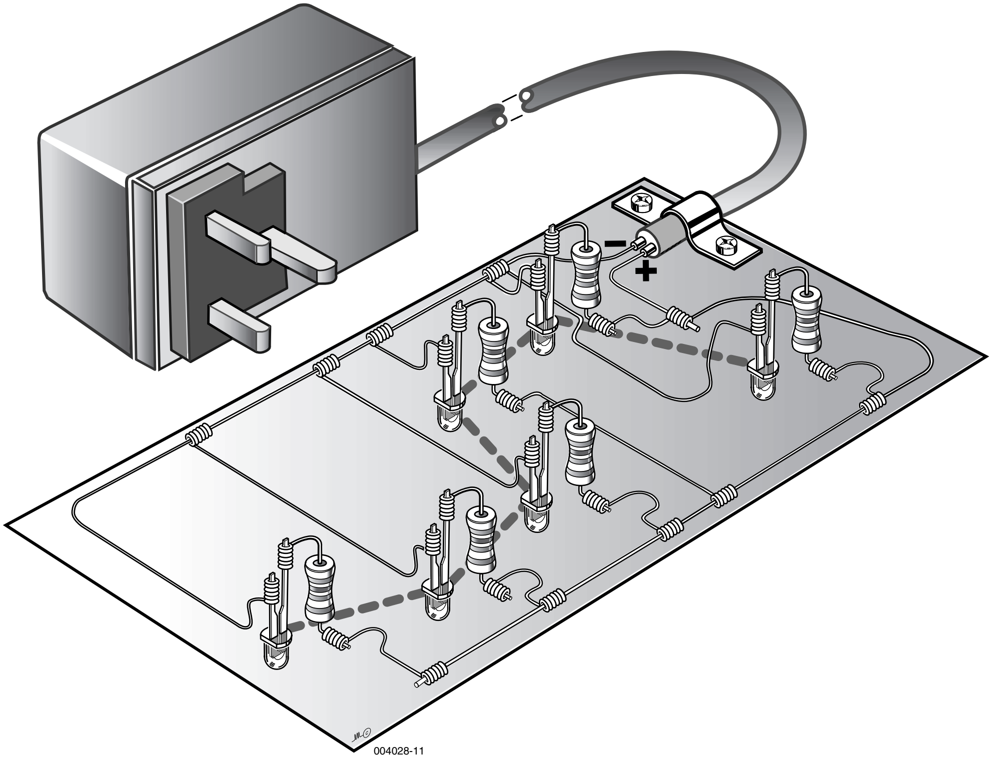
Now that white LEDs are available at reasonable prices, one nice application is an imitation of the night sky. The LEDs emit a rather cold bluish light (6500 to 8000 Kelvin), which gives a good ‘star’ effect. The magnitudes (relative brightnesses) can be reproduced quite well by using different values of series resistors.

There are various ways to build such a model. The simplest is to use a piece of black cardboard, with holes for the LEDs punched in the proper locations. The LEDs can then be taped to the cardboard. ‘Umbrella’ models are also very popular. Here a (large) black umbrella provides a darkened background, and the LEDs are glued into small holes that are carefully made in the umbrella fabric.



The circuit is based on a normal mains adapter, which delivers a safe voltage. A standard adapter can deliver 300 mA, which is enough to power 15 LEDs at 20 mA each. For a larger night sky model, you will need a more powerful adapter (500 or 1000 mA), or you will have to divide the sky into several sections, each with its own mains adapter. We want to have at most 20 mA flow through each LED. If the adapter output is set to 6 V, the value of the series resistor can be easily calculated:

$$R = (6 - 3.5)\ \mathrm{V} \div 20\ \mathrm{mA} = 125\ \Omega$$

We can use a standard value of 120 Ω or 150 Ω. Larger values will cause the LED to be less bright.

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